west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

December 30, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706397, issued to ANTERO RESOURCES CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: MCMILLIAN UNIT 1H
Farm Name: TRUSTEES CHESTNUT GROVE C
API Well Number: 47-1706397
Permit Type: Horizontal 6A Well
Date Issued: 12/30/2013

Promoting a healthy environment.

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACOE). Through this permit, you are hereby being advised to consult with USACOE regarding this proposed activity.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations,* 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

dep	**Applicant:** Antero Resources Corporation **Reference ID: McMillan Unit 1H (Chestnut Pad) (09/26/2013)** **Status: New**	**Type: Horizontal 6A Well** **Permit ID: New/Pending** **Printed: Dec. 30, 2013 2:06 PM**

WW-6B: General and Location Information

API Number: 47-017-06397 (47-____-_____)

Operator's Well Number: McMillan Unit 1H

Filing Fee: ○ First Well on Pad ◉ Subsequent Well on Pad 5,150.00

Well Pad Name: Chestnut Pad

Surface Owner: Trustees of Chestnut Grove Church

Public Road Access: CR 14

Please attach each of the following as seperate documents:

- Well Plat
- Wellbore Schematic

County: Doddridge District: West Union

Quadrangle: SMITHBURG

Top Hole(UTM NAD83):

Easting: 524020 Northing: 4357130 Zone: 17

Proposed Landing Point(UTM):

Easting: 524219 Northing: 4357252 Zone: 17

Proposed Bottom Hole(UTM):

Easting: 525374 Northing: 4354393 Zone: 17

Elevations (feet) -- Current Ground: 1155 Proposed Post-Construction: 1115

Well Type: ◉ Gas ○ Oil

○ Underground Storage ○ Other

Will well be drilled more than 100 feet into the Onondaga Group? ○ Yes ◉ No

Depth Type: ◉ Shallow ○ Deep

Existing Pad? ○ Yes ◉ No

Target Formations

Complete the following table.

Target Formation	Depth-Top (ft)	Anticipated Thickness (ft)	Associated Pressure (psi)
Marcellus Shale	7200	55	2950

Depth Specifics

Proposed Post-Construction Elevation: 1377

Proposed Total Vertical Depth: 7200 (ft.)

Formation at Total Vertical Depth: Marcellus Shale

Proposed Total Measured Depth: 18750 (ft.)

Proposed Total Horizontal Leg Length: 10120 (ft.)

Method to Determine Fresh Water Depth:

Offset well records. Depths have been adjusted according to surface elevations.

Approximate Fresh Water Strata Depths
222 (ft.)
249 (ft.)

Approximate Coal Seam Depths		
295 (ft.)	Coal Seam Name, if known:	
812 (ft.)	Coal Seam Name, if known:	
1122 (ft.)	Coal Seam Name, if known:	

Approximate Depth to Possible Void(coal mine, karst, other)	
(ft.)	Not Anticipated: ☑

Approximate Saltwater Depths
1020 (ft.)
1514 (ft.)

Well Work and Mine Details

Is proposed well location directly overlying or tributary to an active mine?

○ Yes ◉ No

If Yes, indicate name, depth, coal seam and owner of mine:

Coal Seam: Depth:

Mine Name: Owner:

Describe proposed well work, including the drilling and plugging back of any pilot hole.

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

Describe fracturing/stimulating methods in detail, including anticipated max pressure and anticipated max rate.

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 17.91

Area to be disturbed for well pad only, less access road (acres): 2.69

Casing and Cementing

Complete the following table, adding as many rows of each **Type** as needed.

Type	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	Footage: For Drilling	Intervals: Left in Well
Conductor	20"	New	H-40	94#	40	40
	Wellbore Diameter (in)		Wall Thickness (in)		Burst Pressure (psi)	
	24"		0.438"		1530	
	Cement Type	Yield (cu. ft./sk)	Fillup - Cubic Feet		Top of Cement	Circulated to Surface?
	Class A	1.18	38		0	☑

Type	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	Footage: For Drilling	Intervals: Left in Well
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	300	300
	Wellbore Diameter (in)		Wall Thickness (in)		Burst Pressure (psi)	
	17-1/2"		.38"/.33"		2730	
	Cement Type	Yield (cu. ft./sk)	Fillup - Cubic Feet		Top of Cement	Circulated to Surface?
	Class A	1.18	417		0	☑

Type	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	Footage: For Drilling	Intervals: Left in Well
Coal	9-5/8"	New	J-55	36#	2450	2450

Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)
12-1/4"	0.352"	3520

Cement Type	Yield (cu. ft./sk)	Fillup - Cubic Feet	Top of Cement	Circulated to Surface?
Class A	1.18	998	0	☑

Type	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	Footage: For Drilling	Intervals: Left in Well
Production	5-1/2"	New	P-110	20#	18750	18750

Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)
8.75"/8.5"	0.361"	12630

Cement Type	Yield (cu. ft./sk)	Fillup - Cubic Feet	Top of Cement	Circulated to Surface?
Lead-H/POZ & Tail - H	H/POZ-1.44	4763	1950	☐

Type	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	Footage: For Drilling	Intervals: Left in Well
Tubing	2-3/8"	New	N-80	4.7#	N/A	7100

Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)
4.778"	0.19"	11200

Cement Type	Yield (cu. ft./sk)	Fillup - Cubic Feet	Top of Cement	Circulated to Surface?
N/A	N/A	N/A	N/A	☐

Packers

Will Packers be Used? ○ Yes ◉ No

If Yes, complete the following:

Kind	Sizes	Depths Set

Fluids, Cuttings Disposal and Reclamation Plan

State: West Virginia
County: Doddridge
District: 017
Quadrangle: SMITHBURG
Zone: 17
Northing: 4357130
Easting: 524020

API Number: 47-017-06397
Operator Well Number: McMillan Unit 1H

Do you anticipate drilling/redrilling well work?

◉ Yes ○ No

Will a pit be used for plugging activities? ○ Yes ◉ No

If so, please describe anticipated pit waste:

No pit will be used at this site. *See Closed Loop for Addtl Detail

Will a synthetic liner be used in the pit? ○ Yes ◉ No

If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Waste Water:

☐ Underground Injection (UIC Permit Number)

☑ Reuse (at API Number

Form WR-34)

☐ Other (explain)

Will closed loop system be used? ◉ Yes ○ No

If so, describe:

*Drilling and Flowback fluids will be stored in tanks. Cuttings will be tanked and hauled off site.

1. Steel mud pits as part of the rig equipment for cleaning and conditioning the mud prior to being pumped down hole 2. Half rounds under the shale shakers for capturing cuttings and an auger for transporting cuttings from the half round to the cuttings boxes that are used to haul the cuttings to an approved offsite disposal facility
3. Frac tanks for any excess capacity mud storage that is required bayound the rig's steel pits
4. A flow line that transports the mud from the wellbore to the steel pits for cleaning and conditioning
5. Hose lines running from the steel mud pits to the mud pumps and from the mud pumps to the top drive for transporting the mud to the drill pipe to be sent down hole

Please note: We DO NOT use an earthen reserve pit. Not using an earthen reserve pit is generally considered to be the definition of a "closed loop" mud system.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

Surface - Air/Freshwater, Intermediate - Dust/Stiff Foam, Production - Water Based Mud

If oil based, what type? Synthetic, petroleum, etc.

N/A

Additives to be used in drilling medium?

Please See Attachment

Drill cuttings disposal method?

- [ ] Leave in Pit (medium used) N/A Explain:
- [ ] Landfill (name/permit number?)
- [ ] Removed Offsite (name/permit number?) Meadowfill Landfill-Permit #SWF-1032-98
- [ ] Other: (please explain)

Proposed Revegetation Treatment:

Acres Disturbed: 17.91 Prevegetation pH: N/A

Lime Tons/acre to correct to pH: 2-4

Fertilizer (10-20-20 or equivalent): 500 lbs/acre

Mulch 2-3 lbs/acre

Comments:

Hay or straw or Wood Fiber (will be used where needed)

DISTURBANCE: Main Access Roads to Pads (3.98) + Drill Pad (2.69) + Spoil Pads & Auxiliary Pad (11.24) = 17.91 Acres.

Seed Mixtures

Area Type	Seed Type	lbs/acre
Temporary	Tall Fescue	45
Temporary	Perennial Rye Grass	20
Permanent	Tall Fescue	45
Permanent	Perennial Rye Grass	20

WW-6B
(9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 17.91 acres

22) Area to be disturbed for well pad only, less access road (acres): 2.69 acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.
Surface: Class A cement with 2-3% calcium chloride
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

Form WW-9 Additives Attachment

SURFACE INTERVAL

1. Fresh Water
2. Soap –Foamer AC
3. Air

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
2) 1 ppb Conqor 404 (11.76 ppg) / Corrosion Inhibitor
3) 4 ppb KLA-Gard (9.17 ppg) / Amine Acid Complex-Shale Stabilizer
4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
5) 12 ppb KCL / Potassium Chloride-inorganic Salt
6) Fresh Water 80 bbls
7) Air

PRODUCTION INTERVAL

1. Alpha 1655
   Salt Inhibitor
2. Mil-Carb
   Calcium Carbonate
3. Cottonseed Hulls
   Cellulose-Cottonseed Pellets – LCM
4. Mil-Seal
   Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM
5. Clay-Trol
   Amine Acid Complex – Shale Stabilizer
6. Xan-Plex
   Viscosifier For Water Based Muds
7. Mil-Pac (All Grades)
   Sodium Carboxymethylcellulose – Filtration Control Agent
8. New Drill
   Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer
9. Caustic Soda
   Sodium Hydroxide – Alkalinity Control
10. Mil-Lime
    Calcium Hydroxide – Lime
11. LD-9
    Polyether Polyol – Drilling Fluid Defoamer
12. Mil Mica
    Hydro-Biotite Mica – LCM

13. Escaid 110
    Drilling Fluild Solvent – Aliphatic Hydrocarbon
14. Ligco
    Highly Oxidized Leonardite – Filteration Control Agent
15. Super Sweep
    Polypropylene – Hole Cleaning Agent
16. Sulfatrol K
    Drilling Fluid Additive – Sulfonated Asphalt Residuum
17. Sodium Chloride, Anhydrous
    Inorganic Salt
18. D-D
    Drilling Detergent – Surfactant
19. Terra-Rate
    Organic Surfactant Blend
20. W.O. Defoam
    Alcohol-Based Defoamer
21. Perma-Lose HT
    Fluid Loss Reducer For Water-Based Muds
22. Xan-Plex D
    Polysaccharide Polymer – Drilling Fluid Viscosifier
23. Walnut Shells
    Ground Cellulosic Material – Ground Walnut Shells – LCM
24. Mil-Graphite
    Natural Graphite – LCM
25. Mil Bar
    Barite – Weighting Agent
26. X-Cide 102
    Biocide
27. Soda Ash
    Sodium Carbonate – Alkalinity Control Agent
28. Clay Trol
    Amine Acid complex – Shale Stabilizer
29. Sulfatrol
    Sulfonated Asphalt – Shale Control Additive
30. Xanvis
    Viscosifier For Water-Based Muds
31. Milstarch
    Starch – Fluid Loss Reducer For Water Based Muds
32. Mil-Lube
    Drilling Fluid Lubricant

ANTERO RESOURCES

Well Site Safety Plan
Antero Resources

Well Name: **Mishka Unit 1H, McMillan Unit 1H and 2H, Hoskinson Unit 1H and 2H**

Pad Location: **CHESTNUT PAD**
Doddridge County/ Grant District

GPS Coordinates: Lat 39°21'47.85"/Long 80°43'16.23" (NAD83)

Driving Directions:

From the intersection of US-50 W and County Rd 50/73 near the town of Salem head west on US-50 for 2.9 miles. Turn right onto Co Route 3/Big Flint Rd for 8.6 miles. Lease road will be on your left.

NCN
7-23-2013

SSP Page 1

Water Management Plan:
Primary Water Sources

WMP: 01571	API/ID Number:	047-017-06397	Operator:	Antero Resources
		McMillan Unit 1H		

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED DEC 3 0 2013

Source Summary

WMP- 01571 | API Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Stream/River

- Source: **Ohio River @ Ben's Run Withdrawal Site** | Tyler | Owner: **Ben's Run Land Company Limited Partnership**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.46593	-81.110781

☑ Regulated Stream? Ohio River Min. Flow | Ref. Gauge ID: 9999999 | Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): 3,360 | **Min. Gauge Reading (cfs): 6,468.00** | Min. Passby (cfs)

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml

- Source: **West Fork River @ JCP Withdrawal** | Harrison | Owner: **James & Brenda Raines**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.320913	-80.337572

☑ Regulated Stream? Stonewall Jackson Dam | Ref. Gauge ID: 3061000 | WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): 2,000 | **Min. Gauge Reading (cfs): 175.00** | Min. Passby (cfs) **146.25**

DEP Comments:

- Source: **West Fork River @ McDonald Withdrawal** | Harrison | Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.16761	-80.45069

☑ Regulated Stream? Stonewall Jackson Dam | Ref. Gauge ID: 3061000 | WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): 3,000 | **Min. Gauge Reading (cfs): 175.00** | Min. Passby (cfs) **106.30**

DEP Comments:

- Source **West Fork River @ GAL Withdrawal** **Harrison** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.16422	-80.45173

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): 2,000 **Min. Gauge Reading (cfs): 175.00** **Min. Passby (cfs) 106.30**

DEP Comments:

- Source **Middle Island Creek @ Mees Withdrawal Site** **Pleasants** Owner: **Sarah E. Mees**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.43113	-81.079567

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 3,360 **Min. Gauge Reading (cfs): 52.59** **Min. Passby (cfs) 47.63**

DEP Comments:

- Source **Middle Island Creek @ Dawson Withdrawal** **Tyler** Owner: **Gary D. and Rella A. Dawson**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.379292	-80.867803

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 3,000 **Min. Gauge Reading (cfs): 76.03** **Min. Passby (cfs) 28.83**

DEP Comments:

◎ Source **McElroy Creek @ Forest Withdrawal** **Tyler** Owner: **Forest C. & Brenda L. Moore**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.39675	-80.738197

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 74.77** **Min. Passby (cfs) 13.10**

DEP Comments:

◎ Source **Meathouse Fork @ Gagnon Withdrawal** **Doddridge** Owner: **George L. Gagnon and Susan C. Gagnon**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.26054	-80.720998

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 71.96** **Min. Passby (cfs) 11.74**

DEP Comments:

◎ Source **Meathouse Fork @ Whitehair Withdrawal** **Doddridge** Owner: **Elton Whitehair**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.211317	-80.679592

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 7.28**

DEP Comments:

- Source **Tom's Fork @ Erwin Withdrawal** **Doddridge** Owner: **John F. Erwin and Sandra E. Erwin**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.174306	-80.702992

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 0.59**

DEP Comments:

- Source **Arnold Creek @ Davis Withdrawal** **Doddridge** Owner: **Jonathon Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.302006	-80.824561

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 3.08**

DEP Comments:

- Source **Buckeye Creek @ Powell Withdrawal** **Doddridge** Owner: **Dennis Powell**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.277142	-80.690386

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 4.59**

DEP Comments:

Source **South Fork of Hughes River @ Knight Withdrawal** Ritchie Owner: **Tracy C. Knight & Stephanie C. Knight**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.198369	-80.870969

☐ Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): 3,000 **Min. Gauge Reading (cfs): 39.80** **Min. Passby (cfs) 1.95**

DEP Comments:

Source **North Fork of Hughes River @ Davis Withdrawal** Ritchie Owner: **Lewis P. Davis and Norma J. Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		39.322363	-80.936771

☐ Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 35.23** **Min. Passby (cfs) 2.19**

DEP Comments:

Source Summary

WMP- 01571 | API Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Purchased Water

- Source: **Ohio River @ Select Energy** | Pleasants | Owner: **Select Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000	500,000	39.346473	-81.338727

☑ Regulated Stream? Ohio River Min. Flow | Ref. Gauge ID: 9999998 | Ohio River Station: Racine Dam

Max. Pump rate (gpm): **1,680** | Min. Gauge Reading (cfs): **7,216.00** | Min. Passby (cfs)

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml

- Source: **Middle Island Creek @ Solo Construction** | Pleasants | Owner: **Solo Construction, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000	1,000,000	39.399094	-81.185548

☑ Regulated Stream? Ohio River Min. Flow | Ref. Gauge ID: 9999999 | Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): | Min. Gauge Reading (cfs): **6,468.00** | Min. Passby (cfs)

DEP Comments: Elevation analysis indicates that this location has the same elevation as Middle Island Creek's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.

- Source: **Claywood Park PSD** | Wood | Owner: **Claywood Park PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000		-	-

☑ Regulated Stream? | Ref. Gauge ID: 9999998 | Ohio River Station: Racine Dam

Max. Pump rate (gpm): | Min. Gauge Reading (cfs): **7,216.00** | Min. Passby (cfs)

DEP Comments: Elevation analysis indicates that this location has approximately the same elevation as Little Kanawha's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.

o Source **Sun Valley Public Service District** **Harrison** Owner: **Sun Valley PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/7/2014	7/7/2015	10,980,000	200,000	-	-

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs):** **171.48** **Min. Passby (cfs)**

DEP Comments:

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29585 | Source Name: Ohio River @ Select Energy
Select Energy

Source Latitude: 39.346473
Source Longitude: -81.338727

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 | County: Pleasants

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 1,680
Max. Simultaneous Trucks:
Max. Truck pump rate (gpm)

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☑ Regulated Stream? Ohio River Min. Flow
- ☐ Proximate PSD?
- ☑ Gauged Stream?

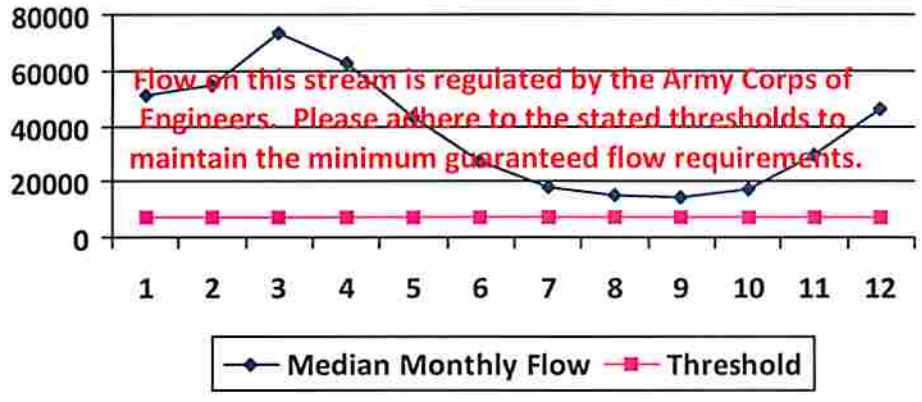
Reference Gaug: 9999998 Ohio River Station: Racine Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 7216

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	50,956.00	-	-
2	54,858.00	-	-
3	73,256.00	-	-
4	62,552.00	-	-
5	43,151.00	-	-
6	27,095.00	-	-
7	17,840.00	-	-
8	14,941.00	-	-
9	14,272.00	-	-
10	17,283.00	-	-
11	29,325.00	-	-
12	46,050.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	3.74
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29586 Source Name: Middle Island Creek @ Solo Construction

Solo Construction, LLC

Source Latitude: 39.399094

Source Longitude: -81.185548

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 County: Pleasants

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? Ohio River Min. Flow
- [x] Proximate PSD? City of St. Marys
- [x] Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm) 0

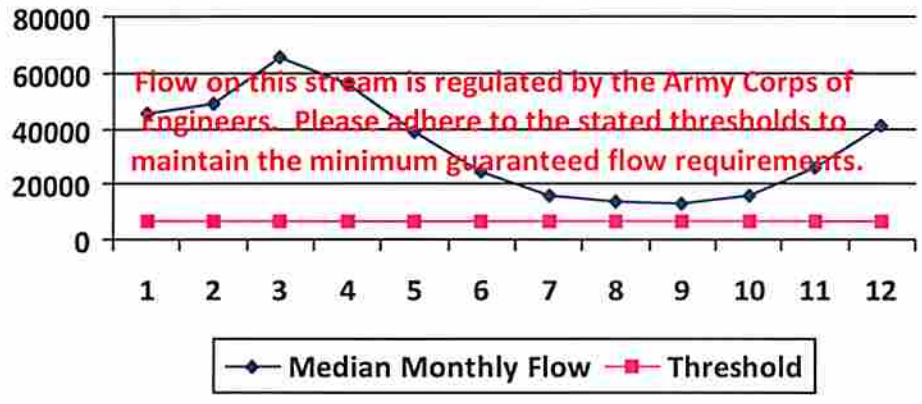
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29587 | Source Name: Claywood Park PSD

Claywood Park PSD

Source Latitude: -

Source Longitude: -

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 25000 | County: Wood

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream?
- [x] Proximate PSD? Claywood Park PSD
- [x] Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

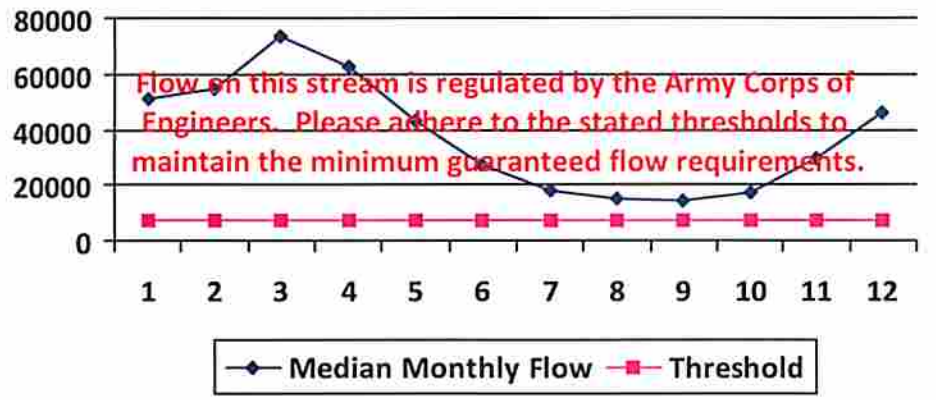
Reference Gaug 9999998 Ohio River Station: Racine Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 7216

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	50,956.00	-	-
2	54,858.00	-	-
3	73,256.00	-	-
4	62,552.00	-	-
5	43,151.00	-	-
6	27,095.00	-	-
7	17,840.00	-	-
8	14,941.00	-	-
9	14,272.00	-	-
10	17,283.00	-	-
11	29,325.00	-	-
12	46,050.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29588 | Source Name: Sun Valley Public Service District / Sun Valley PSD

Source Latitude: -

Source Longitude: -

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 391.85 | County: Harrison

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Stonewall Jackson Dam
- [ ] Proximate PSD?
- [x] Gauged Stream?

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

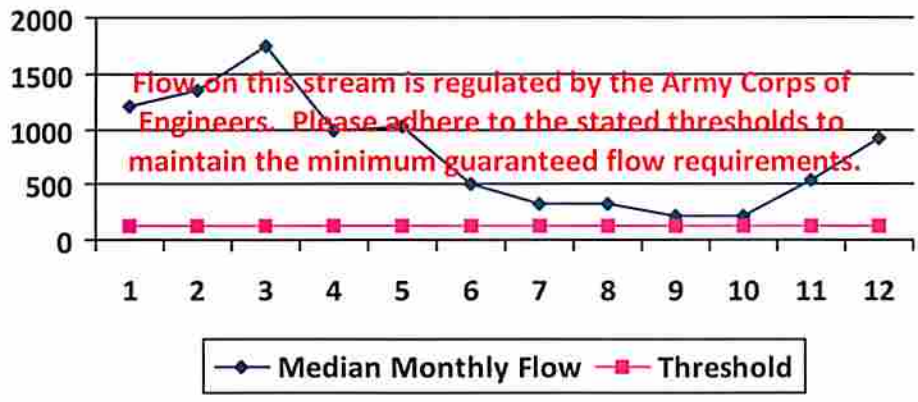
Reference Gaug: 3061000 | WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	1,200.75	-	-
2	1,351.92	-	-
3	1,741.33	-	-
4	995.89	-	-
5	1,022.23	-	-
6	512.21	-	-
7	331.86	-	-
8	316.87	-	-
9	220.48	-	-
10	216.17	-	-
11	542.45	-	-
12	926.12	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	
Downstream Demand (cfs):	
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29571 Source Name: Ohio River @ Ben's Run Withdrawal Site

Ben's Run Land Company Limited Partnership

Source Latitude: 39.46593

Source Longitude: -81.110781

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 County: Tyler

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

☐ Endangered Species? ☑ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☑ Regulated Stream? Ohio River Min. Flow

☐ Proximate PSD?

☑ Gauged Stream?

Max. Pump rate (gpm): 3,360

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

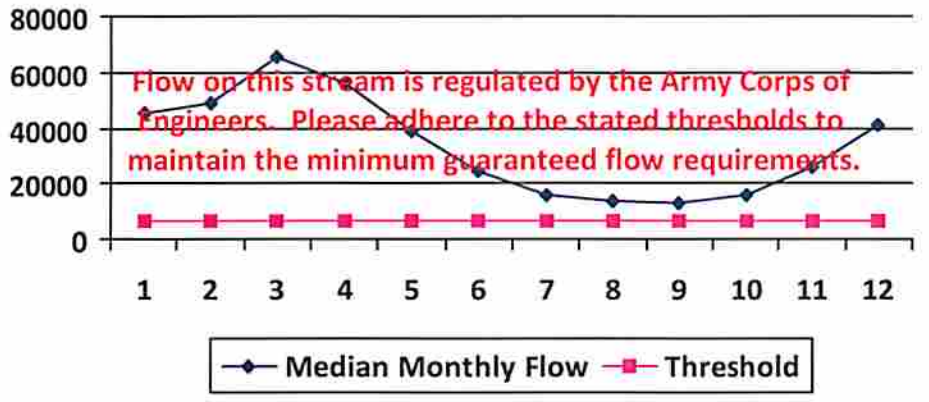
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	7.49
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29572 Source Name: West Fork River @ JCP Withdrawal
James & Brenda Raines

Source Latitude: 39.320913
Source Longitude: -80.337572

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 532.2 County: Harrison

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 2,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? Stonewall Jackson Dam
- [ ] Proximate PSD?
- [x] Gauged Stream?

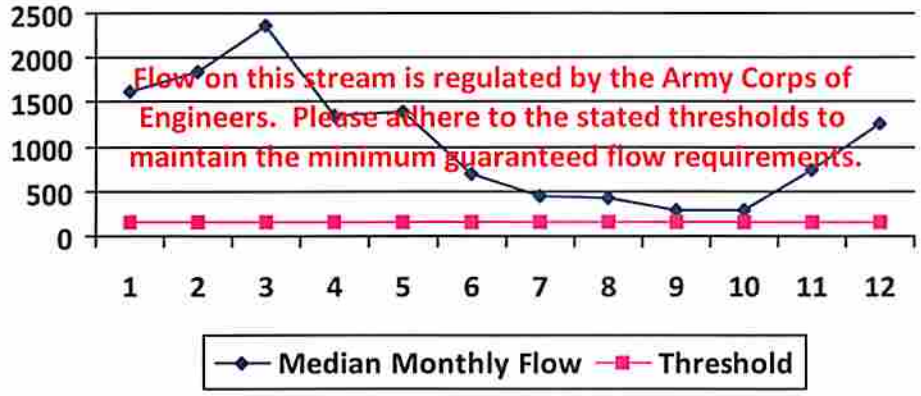
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	1,630.82	-	-
2	1,836.14	-	-
3	2,365.03	-	-
4	1,352.59	-	-
5	1,388.37	-	-
6	695.67	-	-
7	450.73	-	-
8	430.37	-	-
9	299.45	-	-
10	293.59	-	-
11	736.74	-	-
12	1,257.84	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29573 | Source Name: West Fork River @ McDonald Withdrawal

David Shrieves

Source Latitude: 39.16761

Source Longitude: -80.45069

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 314.91 | County: Harrison

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 3,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☑ Regulated Stream? Stonewall Jackson Dam
- ☐ Proximate PSD?
- ☑ Gauged Stream?

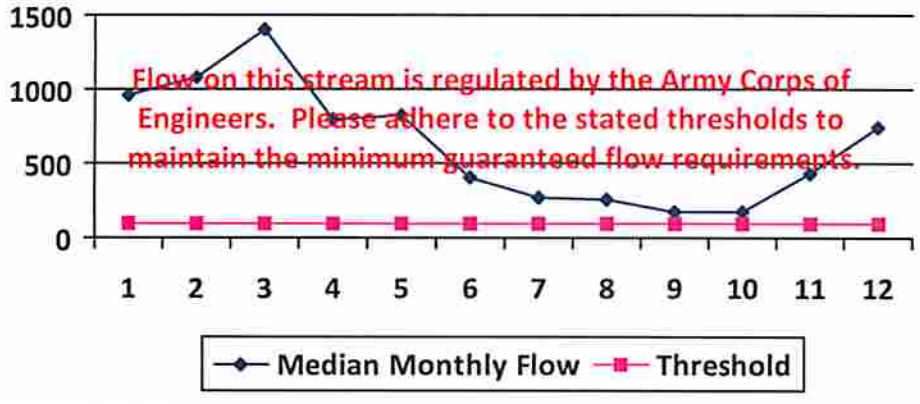
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	964.98	-	-
2	1,086.47	-	-
3	1,399.42	-	-
4	800.34	-	-
5	821.52	-	-
6	411.64	-	-
7	266.70	-	-
8	254.66	-	-
9	177.19	-	-
10	173.72	-	-
11	435.94	-	-
12	744.28	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	6.68
Headwater Safety (cfs):	24.27
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29574 Source Name: West Fork River @ GAL Withdrawal

David Shrieves

Source Latitude: 39.16422

Source Longitude: -80.45173

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 313.67 County: Harrison

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 2,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☑ Regulated Stream? Stonewall Jackson Dam
- ☐ Proximate PSD?
- ☑ Gauged Stream?

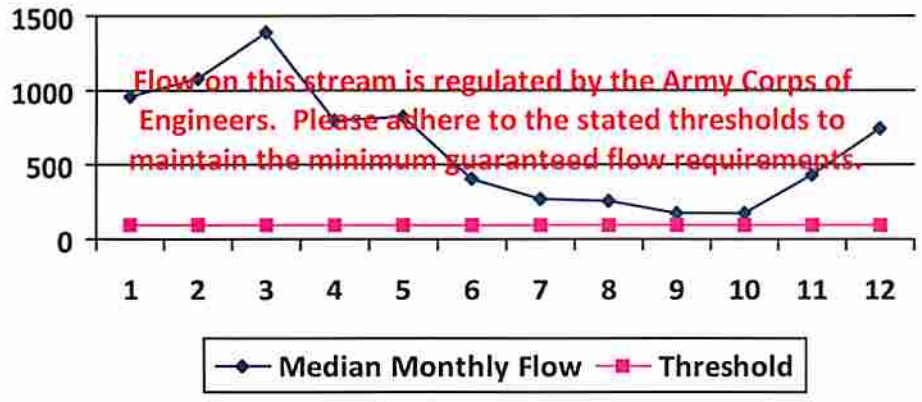
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	961.18	-	-
2	1,082.19	-	-
3	1,393.91	-	-
4	797.19	-	-
5	818.28	-	-
6	410.02	-	-
7	265.65	-	-
8	253.65	-	-
9	176.49	-	-
10	173.04	-	-
11	434.22	-	-
12	741.35	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	24.18
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29575 | Source Name: Middle Island Creek @ Mees Withdrawal Site

Sarah E. Mees

Source Latitude: 39.43113

Source Longitude: -81.079567

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 484.78 | County: Pleasants

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 3,360

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [x] Gauged Stream?

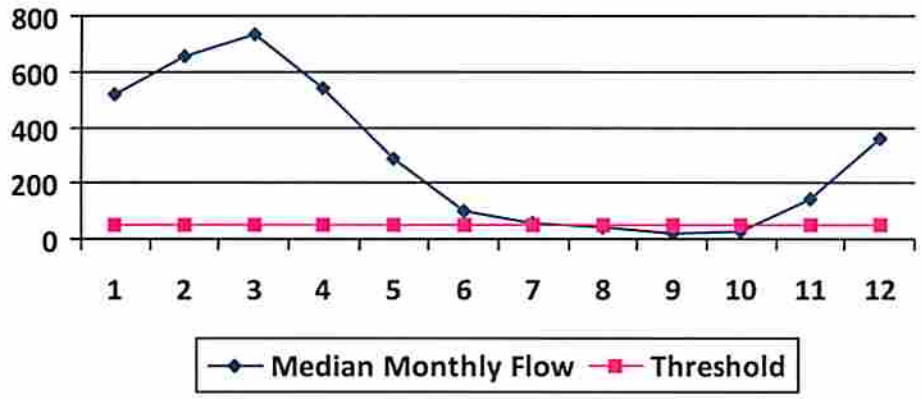
Reference Gaug 3114500 | MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	519.88	55.12	465.14
2	653.95	55.12	599.22
3	731.75	55.12	677.01
4	543.38	55.12	488.65
5	286.64	55.12	231.90
6	100.10	55.12	45.36
7	56.65	55.12	1.91
8	46.64	55.12	-8.10
9	23.89	55.12	-30.85
10	30.01	55.12	-24.72
11	146.56	55.12	91.83
12	358.10	55.12	303.37

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	47.63
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	7.49
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	**52.49**
Passby at Location (cfs):	**47.63**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29576 | Source Name: Middle Island Creek @ Dawson Withdrawal
Gary D. and Rella A. Dawson

Source Latitude: 39.379292
Source Longitude: -80.867803

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 181.34 | County: Tyler

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 3,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [x] Gauged Stream?

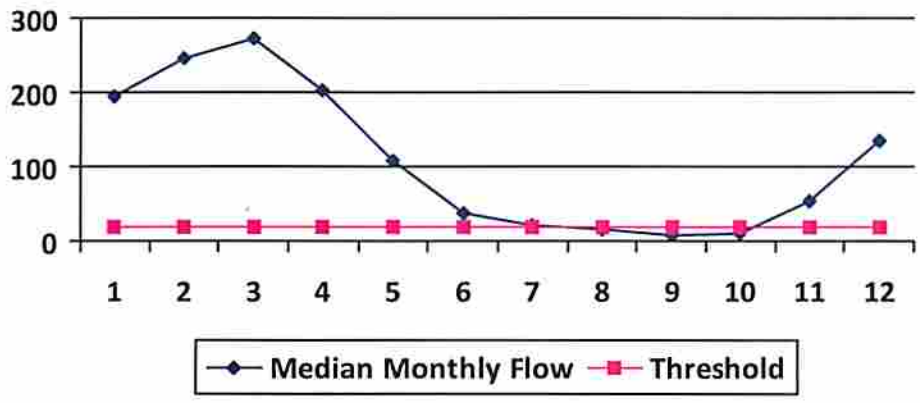
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	194.47	42.06	152.68
2	244.62	42.06	202.83
3	273.72	42.06	231.93
4	203.26	42.06	161.47
5	107.22	42.06	65.43
6	37.44	42.06	-4.35
7	21.19	42.06	-20.60
8	17.45	42.06	-24.34
9	8.94	42.06	-32.85
10	11.23	42.06	-30.56
11	54.82	42.06	13.04
12	133.96	42.06	92.17

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	17.82
Upstream Demand (cfs):	13.10
Downstream Demand (cfs):	6.55
Pump rate (cfs):	6.68
Headwater Safety (cfs):	4.45
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	**76.03**
Passby at Location (cfs):	**28.82**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP: 01571 API/ID Number: 047-017-06397 Operator: Antero Resources

McMillan Unit 1H

Source ID: 29577 Source Name: McElroy Creek @ Forest Withdrawal
Forest C. & Brenda L. Moore

Source Latitude: 39.39675
Source Longitude: -80.738197

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 88.85 County: Tyler

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

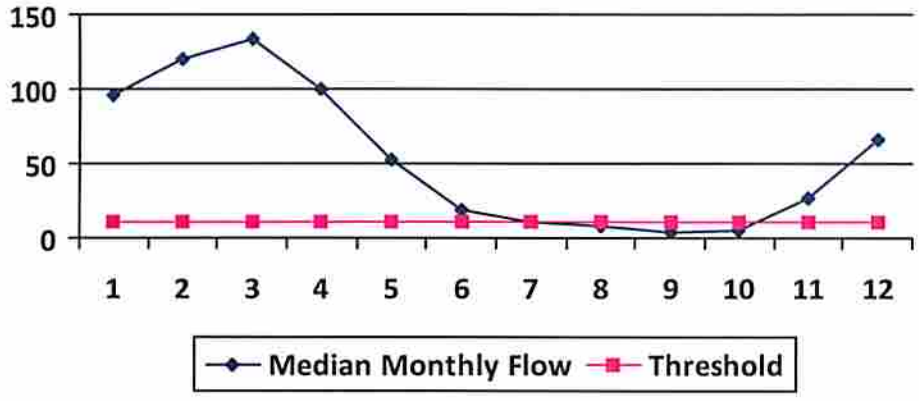
☐ Endangered Species? ☐ Mussel Stream?
☐ Trout Stream? ☐ Tier 3?
☐ Regulated Stream?
☐ Proximate PSD?
☐ Gauged Stream?

Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00 Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	95.28	19.78	75.68
2	119.86	19.78	100.25
3	134.11	19.78	114.51
4	99.59	19.78	79.99
5	52.54	19.78	32.93
6	18.35	19.78	-1.26
7	10.38	19.78	-9.22
8	8.55	19.78	-11.05
9	4.38	19.78	-15.23
10	5.50	19.78	-14.10
11	26.86	19.78	7.26
12	65.63	19.78	46.03

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	8.73
Upstream Demand (cfs):	4.46
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	2.18
Ungauged Stream Safety (cfs):	2.18
Min. Gauge Reading (cfs):	**74.19**
Passby at Location (cfs):	**13.09**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29578 | Source Name: Meathouse Fork @ Gagnon Withdrawal

George L. Gagnon and Susan C. Gagnon

Source Latitude: 39.26054

Source Longitude: -80.720998

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 60.6 | County: Doddridge

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

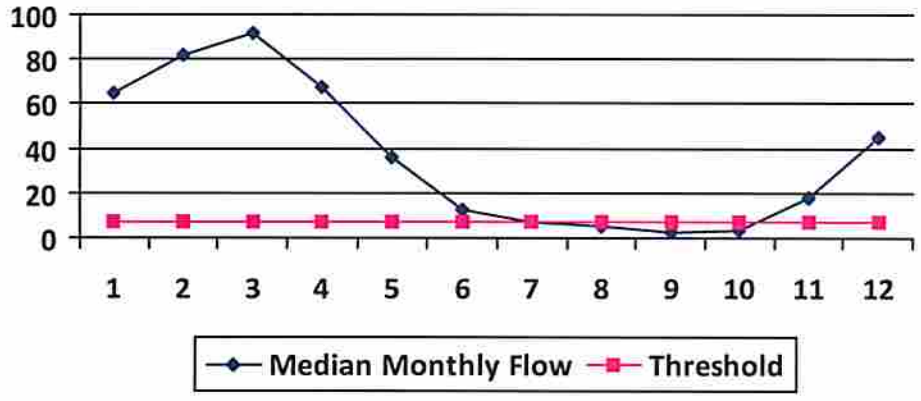
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	64.99	13.39	51.70
2	81.75	13.39	68.46
3	91.47	13.39	78.19
4	67.93	13.39	54.64
5	35.83	13.39	22.55
6	12.51	13.39	-0.77
7	7.08	13.39	-6.20
8	5.83	13.39	-7.45
9	2.99	13.39	-10.30
10	3.75	13.39	-9.53
11	18.32	13.39	5.04
12	44.76	13.39	31.48

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	5.95
Upstream Demand (cfs):	2.23
Downstream Demand (cfs):	2.81
Pump rate (cfs):	2.23
Headwater Safety (cfs):	1.49
Ungauged Stream Safety (cfs):	1.49
Min. Gauge Reading (cfs):	**71.96**
Passby at Location (cfs):	**11.74**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29579 Source Name: Meathouse Fork @ Whitehair Withdrawal

Elton Whitehair

Source Latitude: 39.211317

Source Longitude: -80.679592

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 30.37 County: Doddridge

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

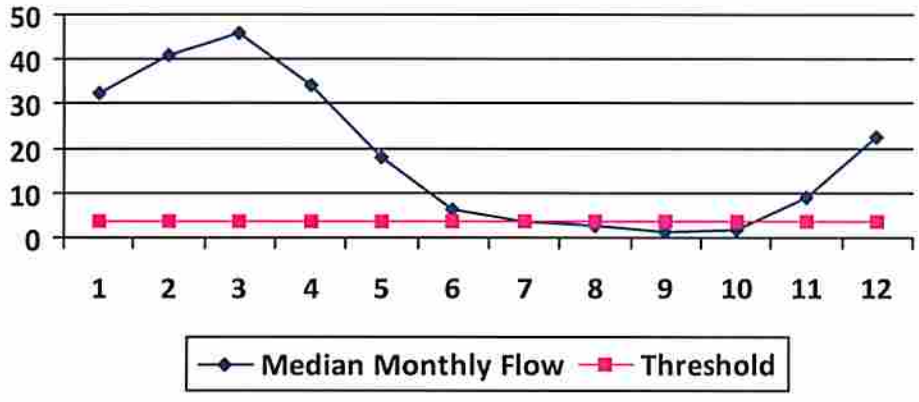
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	32.57	6.70	26.15
2	40.97	6.70	34.55
3	45.84	6.70	39.42
4	34.04	6.70	27.62
5	17.96	6.70	11.54
6	6.27	6.70	-0.15
7	3.55	6.70	-2.87
8	2.92	6.70	-3.50
9	1.50	6.70	-4.92
10	1.88	6.70	-4.54
11	9.18	6.70	2.76
12	22.43	6.70	16.01

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	2.98
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	2.81
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.75
Ungauged Stream Safety (cfs):	0.75
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**7.29**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29580 | Source Name: Tom's Fork @ Erwin Withdrawal

John F. Erwin and Sandra E. Erwin

Source Latitude: 39.174306

Source Longitude: -80.702992

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 4.01 | County: Doddridge

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☐ Regulated Stream?
- ☐ Proximate PSD?
- ☐ Gauged Stream?

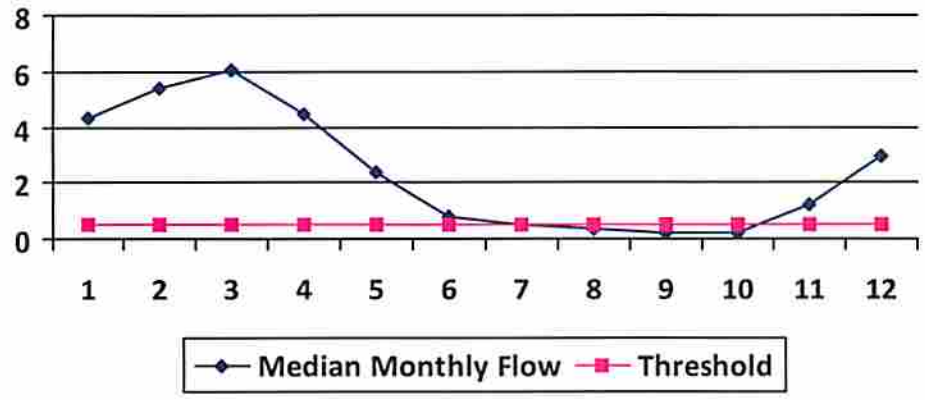
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	4.30	2.82	1.88
2	5.41	2.82	2.98
3	6.05	2.82	3.63
4	4.49	2.82	2.07
5	2.37	2.82	-0.05
6	0.83	2.82	-1.60
7	0.47	2.82	-1.96
8	0.39	2.82	-2.04
9	0.20	2.82	-2.23
10	0.25	2.82	-2.18
11	1.21	2.82	-1.21
12	2.96	2.82	0.54

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	0.39
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.10
Ungauged Stream Safety (cfs):	0.10
Min. Gauge Reading (cfs):	69.73
Passby at Location (cfs):	0.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29581 Source Name: Arnold Creek @ Davis Withdrawal
Jonathon Davis

Source Latitude: 39.302006
Source Longitude: -80.824561

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 20.83 County: Doddridge

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

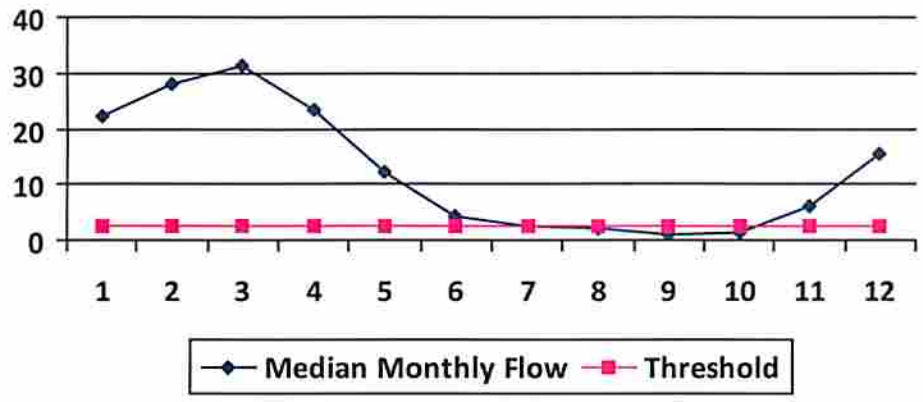
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	22.34	5.30	17.29
2	28.10	5.30	23.05
3	31.44	5.30	26.39
4	23.35	5.30	18.30
5	12.32	5.30	7.26
6	4.30	5.30	-0.75
7	2.43	5.30	-2.62
8	2.00	5.30	-3.05
9	1.03	5.30	-4.03
10	1.29	5.30	-3.76
11	6.30	5.30	1.25
12	15.39	5.30	10.34

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	2.05
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.51
Ungauged Stream Safety (cfs):	0.51
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**3.07**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29582 | Source Name: Buckeye Creek @ Powell Withdrawal
Dennis Powell

Source Latitude: 39.277142
Source Longitude: -80.690386

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 31.15 | County: Doddridge

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☐ Regulated Stream?
- ☐ Proximate PSD?
- ☐ Gauged Stream?

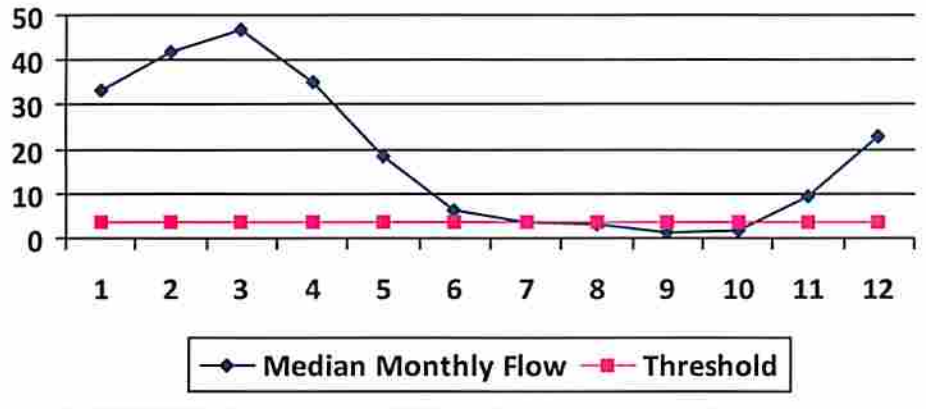
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	33.41	6.82	26.95
2	42.02	6.82	35.56
3	47.02	6.82	40.56
4	34.92	6.82	28.46
5	18.42	6.82	11.96
6	6.43	6.82	-0.03
7	3.64	6.82	-2.82
8	3.00	6.82	-3.46
9	1.53	6.82	-4.92
10	1.93	6.82	-4.53
11	9.42	6.82	2.96
12	23.01	6.82	16.55

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	3.06
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.77
Ungauged Stream Safety (cfs):	0.77
Min. Gauge Reading (cfs):	69.73
Passby at Location (cfs):	4.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP- 01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29583 | Source Name: South Fork of Hughes River @ Knight Withdrawal
Tracy C. Knight & Stephanie C. Knight

Source Latitude: 39.198369
Source Longitude: -80.870969

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 16.26 | County: Ritchie

Anticipated withdrawal start date: 7/7/2014
Anticipated withdrawal end date: 7/7/2015
Total Volume from Source (gal): 10,980,000
Max. Pump rate (gpm): 3,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [x] Gauged Stream?

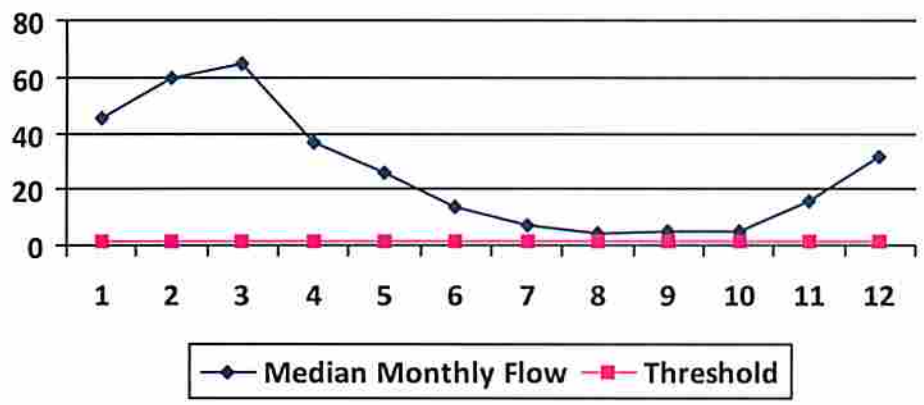
Reference Gaug 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.) 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45.67	14.26	31.44
2	59.55	14.26	45.31
3	65.21	14.26	50.97
4	36.87	14.26	22.63
5	25.86	14.26	11.63
6	13.90	14.26	-0.33
7	6.89	14.26	-7.34
8	3.98	14.26	-10.25
9	4.79	14.26	-9.45
10	5.20	14.26	-9.04
11	15.54	14.26	1.30
12	32.06	14.26	17.82

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	1.56
Upstream Demand (cfs):	5.62
Downstream Demand (cfs):	0.00
Pump rate (cfs):	6.68
Headwater Safety (cfs):	0.39
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	**39.80**
Passby at Location (cfs):	**1.95**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01571 | API/ID Number: 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Source ID: 29584 | Source Name: North Fork of Hughes River @ Davis Withdrawal

Lewis P. Davis and Norma J. Davis

Source Latitude: 39.322363

Source Longitude: -80.936771

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 15.18 | County: Ritchie

Anticipated withdrawal start date: 7/7/2014

Anticipated withdrawal end date: 7/7/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

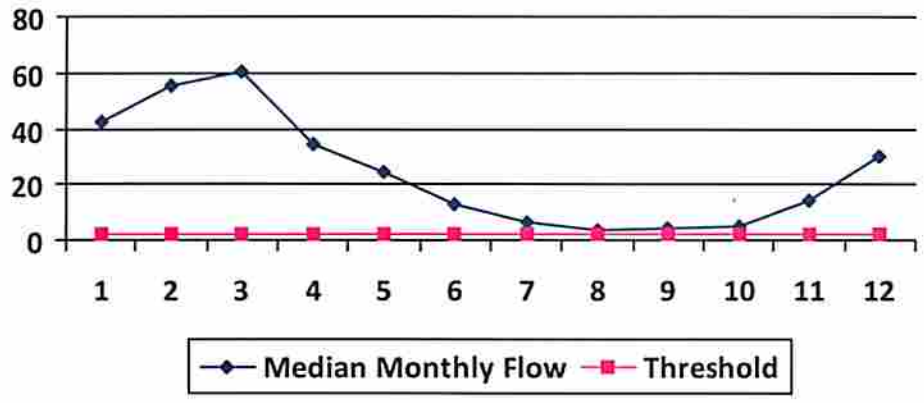
Reference Gaug 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.) 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	42.64	4.42	38.36
2	55.59	4.42	51.32
3	60.88	4.42	56.60
4	34.42	4.42	30.14
5	24.15	4.42	19.87
6	12.98	4.42	8.70
7	6.44	4.42	2.16
8	3.72	4.42	-0.56
9	4.47	4.42	0.19
10	4.85	4.42	0.57
11	14.50	4.42	10.23
12	29.93	4.42	25.65

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	1.46
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.36
Ungauged Stream Safety (cfs):	0.36
Min. Gauge Reading (cfs):	35.23
Passby at Location (cfs):	2.19

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Water Management Plan:
Secondary Water Sources

WMP-01571 | API/ID Number 047-017-06397 | Operator: Antero Resources

McMillan Unit 1H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Lake/Reservior

Source ID: 29589 | Source Name: City of Salem Reservior (Lower Dog Run)
Public Water Provider

Source start date: 7/7/2014
Source end date: 7/7/2015

Source Lat: 39.28834 | Source Long: -80.54966 | County: Harrison

Max. Daily Purchase (gal): 1,000,000 | Total Volume from Source (gal): 10,980,000

DEP Comments:

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 29590 Source Name Pennsboro Lake
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.281689 Source Long: -80.925526 County Ritchie
Max. Daily Purchase (gal) Total Volume from Source (gal): 10,980,000
DEP Comments:

Source ID: 29591 Source Name Powers Lake (Wilderness Water Park Dam)
Private Owner
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.255752 Source Long: -80.463262 County Harrison
Max. Daily Purchase (gal) Total Volume from Source (gal): 10,980,000
DEP Comments:

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 29592 Source Name Powers Lake Two

Source start date: 7/7/2014
Source end date: 7/7/2015

Source Lat: 39.247604 Source Long: -80.466642 County Harrison

Max. Daily Purchase (gal)

Total Volume from Source (gal): 10,980,000

DEP Comments:

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Other

Source ID: 29593 Source Name: Poth Lake (Landowner Pond)
Private Owner
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.221306 Source Long: -80.463028 County: Harrison
Max. Daily Purchase (gal):
Total Volume from Source (gal): 10,980,000
DEP Comments:

Source ID: 29594 Source Name: Williamson Pond (Landowner Pond)
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.19924 Source Long: -80.886161 County: Ritchie
Max. Daily Purchase (gal):
Total Volume from Source (gal): 10,980,000
DEP Comments:

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 29595 Source Name Eddy Pond (Landowner Pond)
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.19924 Source Long: -80.886161 County Ritchie
Max. Daily Purchase (gal) Total Volume from Source (gal): 10,980,000
DEP Comments:

Source ID: 29596 Source Name Hog Lick Quarry Industrial Facility
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 39.419272 Source Long: -80.217941 County Marion
Max. Daily Purchase (gal) 1,000,000 Total Volume from Source (gal): 10,980,000
DEP Comments:

Important:

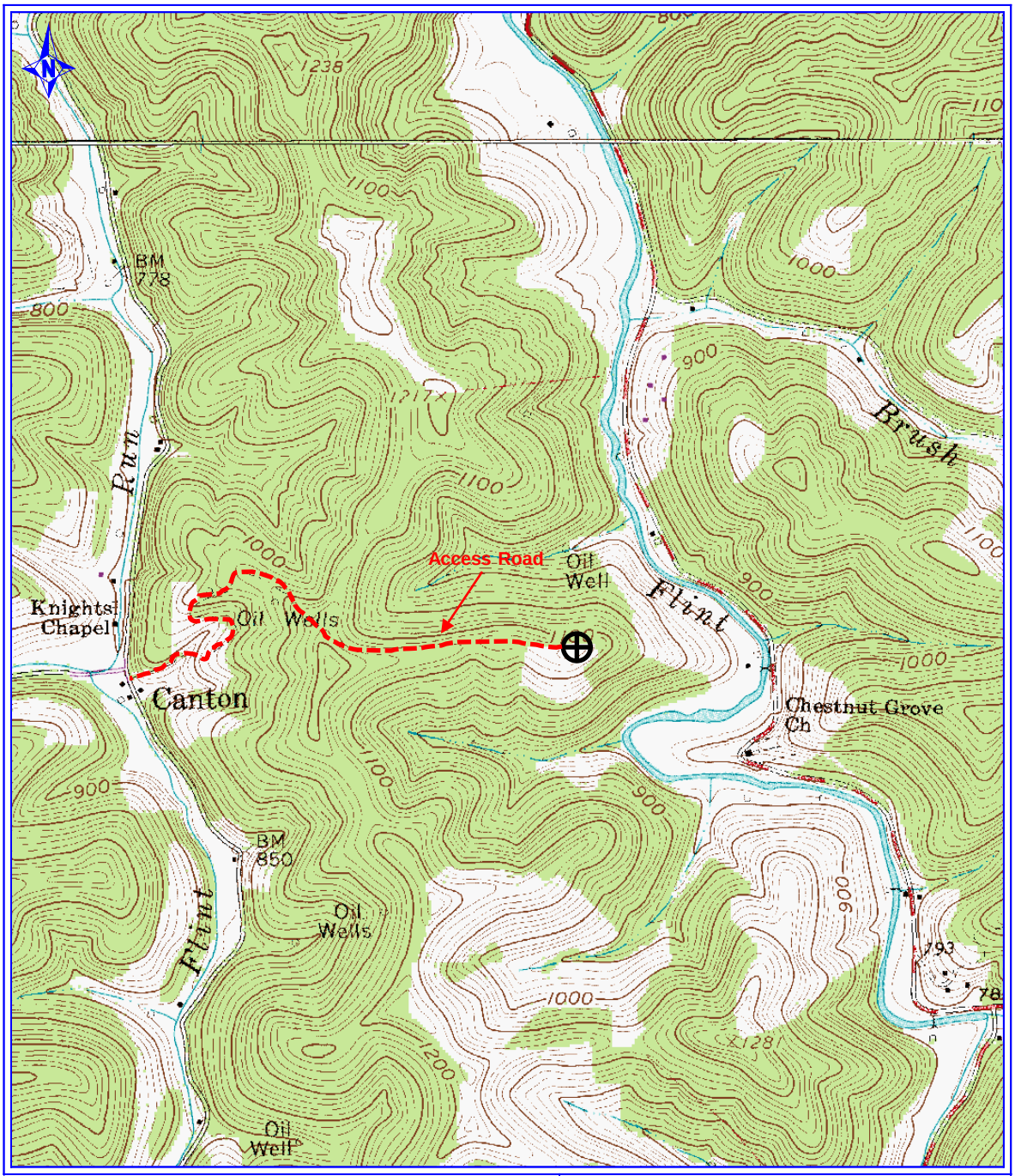
For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 29597 Source Name Glade Fork Mine Industrial Facility
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: 38.965767 Source Long: -80.299313 County Upshur
Max. Daily Purchase (gal) 1,000,000 Total Volume from Source (gal): 10,980,000
DEP Comments:

Recycled Frac Water

Source ID: 29598 Source Name Various
Source start date: 7/7/2014
Source end date: 7/7/2015
Source Lat: Source Long: County
Max. Daily Purchase (gal) Total Volume from Source (gal): 10,980,000
DEP Comments: Sources may include, but are not limited to: Chadwell Unit 1H



PETRA 4/16/2013 5:03:01 PM

Antero Resources Corp

APPALACHIAN BASIN

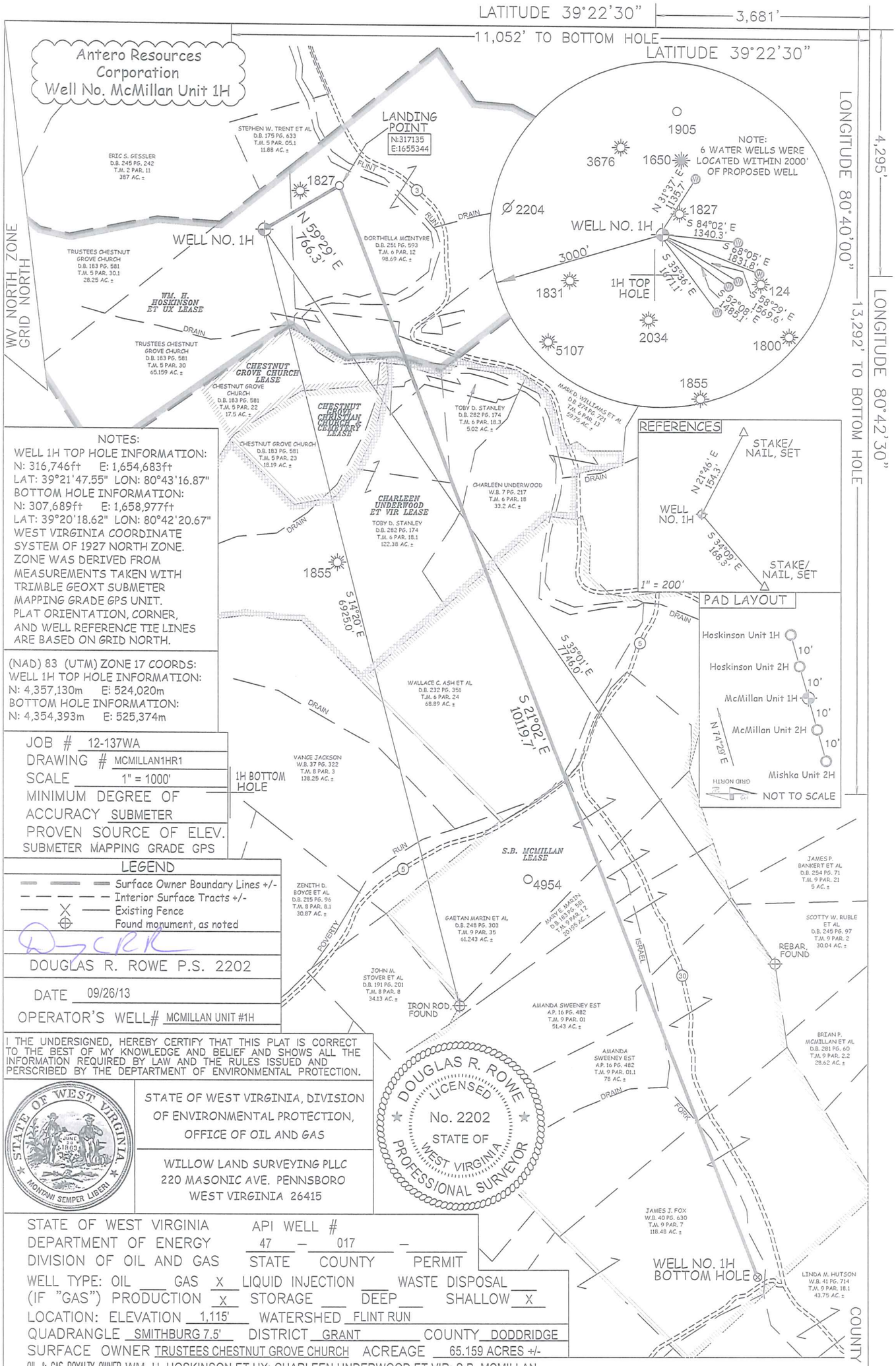
McMillan Unit 1H

Doddridge County

REMARKS
QUADRANGLE: SMITHBURG
WATERSHED: LITTLE FLINT RUN
DISTRICT: GRANT

By: ECM

0 2,500
FEET



NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 316,746ft E: 1,654,683ft
LAT: 39°21'47.55" LON: 80°43'16.87"
BOTTOM HOLE INFORMATION:
N: 307,689ft E: 1,658,977ft
LAT: 39°20'18.62" LON: 80°42'20.67"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,357,130m E: 524,020m
BOTTOM HOLE INFORMATION:
N: 4,354,393m E: 525,374m

JOB # 12-137WA
DRAWING # MCMILLAN1HR1
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND
Surface Owner Boundary Lines +/-
Interior Surface Tracts +/-
Existing Fence
Found monument, as noted

DOUGLAS R. ROWE P.S. 2202

DATE 09/26/13
OPERATOR'S WELL# MCMILLAN UNIT #1H

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPTARTMENT OF ENVIRONMENTAL PROTECTION.

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

DOUGLAS R. ROWE LICENSED No. 2202 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

API WELL # 47 — 017 — (STATE — COUNTY — PERMIT)

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,115' WATERSHED FLINT RUN
QUADRANGLE SMITHBURG 7.5' DISTRICT GRANT COUNTY DODDRIDGE
SURFACE OWNER TRUSTEES CHESTNUT GROVE CHURCH ACREAGE 65.159 ACRES +/-
OIL & GAS ROYALTY OWNER WM. H. HOSKINSON ET UX; CHARLEEN UNDERWOOD ET VIR; S.B. MCMILLAN
LEASE ACREAGE 228.5 ACRES±; 127.11 ACRES±; 432 ACRES±
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___ PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,200' TVD 18,750' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1625 17TH STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

FORM WW-6

API#1706274

CHESTNUT DRILL PAD SITE
FINAL SITE DESIGN, CONSTRUCTION PLAN, AND EROSION & SEDIMENT CONTROL PLANS

ANTERO RESOURCES APPALACHIAN CORPORATION

APPROVED WVDEP OOG
SAY 6/19/2013

NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE

Electronic Version of Plans Can Be Viewed at: Q\OIL GAS\SAY FILES\REVIEWS

● PROJECT LOCATION

WATERSHED (HUC8): LITTLE MUSKINGUM-MIDDLE ISLAND

SMITHBURG 7.5 QUAD

● PROJECT LOCATION
SCALE 1" = 2000'

WELL HEAD LAYOUT STATE PLANE NAD 83 (WV NORTH ZONE)				
	NORTH	EAST	LATITUDE	LONGITUDE
MISHKA UNIT 2H	316775.0748	1623222.8669	39-21-47.7869	-80-43-16.4840
McMILLAN UNIT 2H	316770.6503	1623232.6024	39-21-47.8249	-80-43-16.3620
McMILLAN UNIT 1H	316781.3257	1623242.2529	39-21-47.0524	-80-43-16.2404
HOSKINSON UNIT 2H	316786.0011	1623251.0733	39-21-47.8881	-80-43-16.1182
HOSKINSON UNIT 1H	316790.6765	1623261.5087	39-21-47.0078	-80-43-15.9960

DRILL PAD ELEVATION=1115.0'

WELL LOCATION RESTRICTIONS

THE PAD COMPLIES WITH THE FOLLOWING RESTRICTIONS:

-250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
-625' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD
-100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
-300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
-1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY

AFFECTED TAX PARCELS:

DENZIL F. PRATT	DENZIL F. PRATT	DENZIL F. PRATT	ROBERT J. SMITH	TRUSTEES CHESTNUT GROVE CHURCH	TRUSTEES CHESTNUT GROVE CHURCH
DB 202 PAGE 227	DB 202 PAGE 227	DB 195 PAGE 595	DB 245 PAGE 326	DB 183 PAGE 581	DB 183 PAGE 581
TM 5 PARCEL 20	TM 5 PARCEL 19	TM 5 PARCEL 10	TM 5 PARCEL 9	TM 5 PARCEL 30	TM 5 PARCEL 30.1
GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT

PROJECT CONTACTS

ANTERO RESOURCES
ANTHONY SMITH, FIELD ENGINEER
304-899-3485 OFFICE
304-673-6196 CELL

ELI WAGONER, ENVIRONMENTAL ENGINEER
304-622-3842, EXT. 311
OFFICE 304-476-9770

JOHN KAWCAK, ENGINEER
817-368-1553

AARON KUNZLER, CONSTRUCTION SUPERVISOR
405-277-8344

SURVEYOR & ENGINEER
WHITE BROTHERS CONSULTING, LLC
LEE SNYDER, P.S.
304-550-0484
TIMOTHY T. WHITE, P.E.
304-561-4477

SITE LOCATIONS STATE PLANE NAD 83 (WV NORTH ZONE)		
	LATITUDE	LONGITUDE
CENTER OF PAD	39-21-47.8537	-80-43-16.2343
BEGIN ENTRANCE ROAD	39-21-46.2333	-80-44-04.8012
CENTER OF PAD (UTM 83-17 M)	N 4357128.882	E 524019.989

TOTAL DISTURBANCE (ACRES)	
LAND OWNER	AREA
DENZIL F. PRATT (PAR. 10)	3.40
DENZIL F. PRATT (PAR. 19)	0.00
DENZIL F. PRATT (PAR. 20)	0.00
ROBERT J. SMITH (PAR. 9)	0.00
TRUSTEES CHESTNUT GROVE CHURCH (PAR. 30)	3.78
TRUSTEES CHESTNUT GROVE CHURCH (PAR. 30.1)	11.82

NOTE: A PORTION OF THE TOTAL LOD WAS ACCOUNTED FOR IN THE RJ SMITH PAD SITE DESIGN.

LOD AREAS (ACRES)	
DESCRIPTION	AREA
MAIN ACCESS ROAD TO PAD AND TRUCK TURNOUTS	11.12
DRILL PAD	2.69
SPOIL PAD	5.19
TOTAL	19.00
TOTAL WOODED	19.00

NOTE: A PORTION OF THE TOTAL LOD WAS ACCOUNTED FOR IN THE RJ SMITH PAD SITE DESIGN.

LENGTH (FEET)	
DESCRIPTION	FEET
COUNTY ROUTE TO END OF RJ SMITH PERMITTED ROAD	1,555.87
END OF RJ SMITH PERMITTED ROAD TO CHESTNUT PAD	3,282.13
TOTAL	4,838

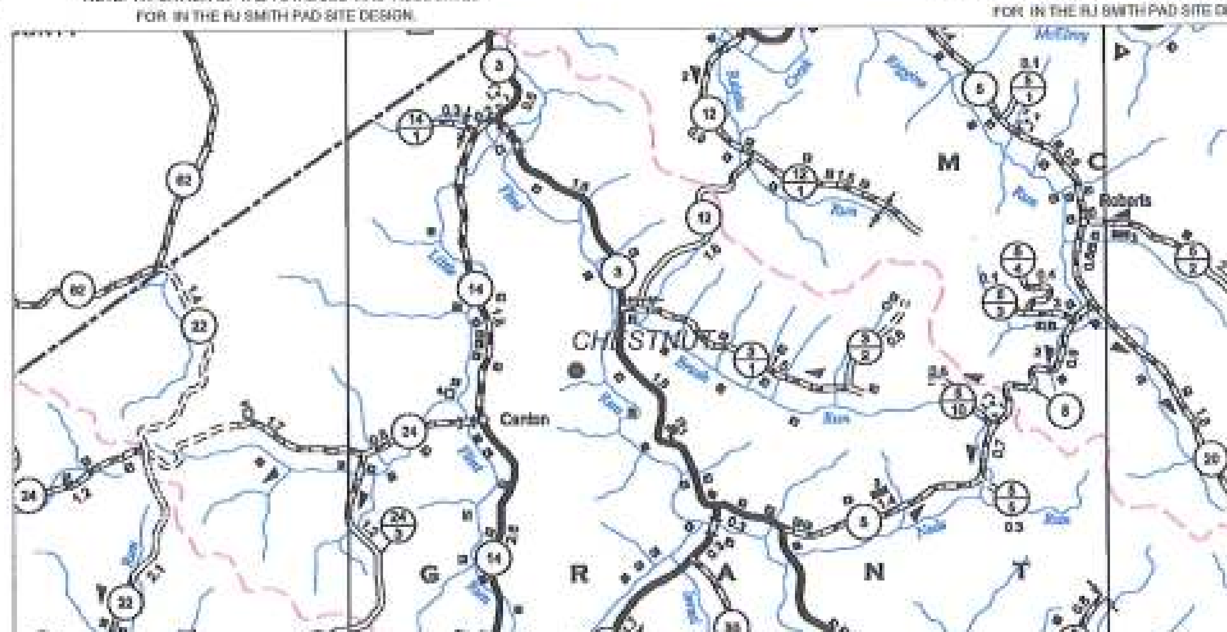
STREAM IMPACTS (LINEAR FEET)	
DESCRIPTION	LINEAR FEET
RPW PERENNIAL	0
NRPW EPHEMERAL	0
PEM WETLANDS	0
RPW INTERMITTENT	0
TOTAL	0

NOTE: ALL STREAM IMPACTS WERE ACCOUNTED FOR IN THE RJ SMITH PAD SITE DESIGN.

FLOODPLAIN CONDITIONS	
DO SITE CONSTRUCTION ACTIVITIES TAKE PLACE IN FLOODPLAIN:	NO
PERMIT NEEDED FROM COUNTY FLOODPLAIN COORDINATOR:	NO
HEC-RAS STUDY COMPLETED:	N/A
FLOODPLAIN SHOWN ON DRAWINGS:	N/A
FIRM MAP NUMBER(S) FOR SITE:	54017C0130C
ACREAGES OF CONSTRUCTION IN FLOODPLAIN:	N/A

MISS UTILITY OF WEST VIRGINIA
1-800-245-4848
WEST VIRGINIA STATE LAW REQUIRES THAT YOU CALL TWO BUSINESS DAYS BEFORE YOU DIG IN THE STATE OF WEST VIRGINIA. IT'S THE LAW!!

811
Know what's below. Call before you dig.



SHEET INDEX

DESIGN CERTIFICATION
THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS §35-4-21.

MM-109 PERMIT
ANTERO RESOURCES WILL OBTAIN AN ENCROACHMENT PERMIT (MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

DATE SURVEYED	SHEET NO.	TOTAL SHEETS
6-13-2013	1	30

White Brothers Consulting, LLC
ENGINEERING AND SURVEYING
447 CALL ROAD, SUITE 3
CHARLESTON, WV 25312
(304)550-0484
www.white-brothers.com

TIMOTHY T. WHITE REGISTERED 18975 PROFESSIONAL ENGINEER
6-13-13

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL SITE DESIGN, QUANTITIES AND CONSTRUCTION SEQUENCE
CHESTNUT DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

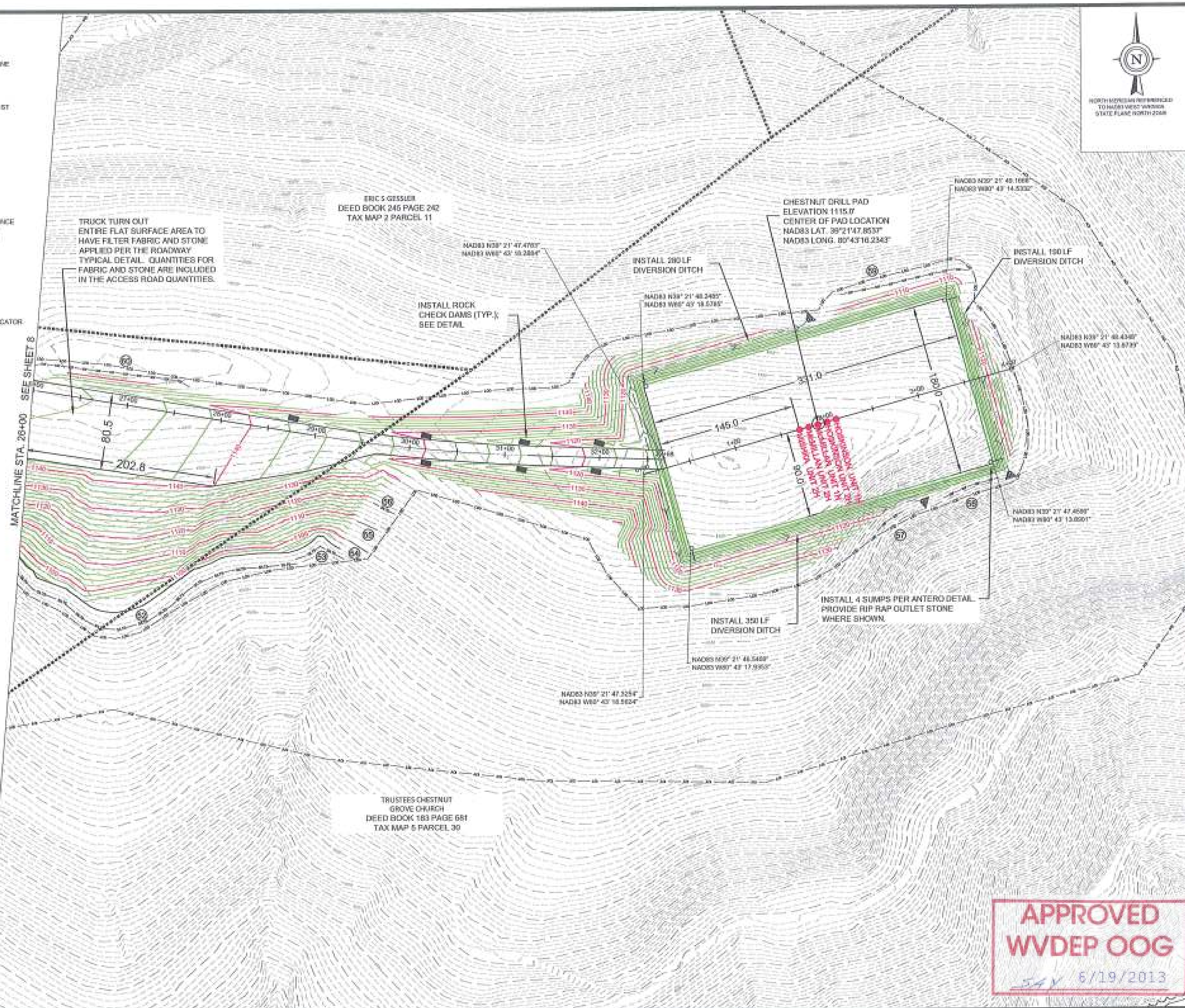
REVISION	DATE	BY

LEGEND

- - - - - - - -	APPROXIMATE PROPERTY LINE
—LOD—LOD—	LIMITS OF DISTURBANCE
—AOI—AOI—	AREA OF INTEREST
—PAOI—PAOI—	PROPOSED AREA OF INTEREST
—SF—SF—	SILT FENCE
—SSF—SSF—	SUPER SILT FENCE
—SS—SS—	SILT SOCK
	EXISTING GAS LINE
	EXISTING FENCE LINE
	EXISTING UTILITY POLE
	EXISTING TREE LINE
	PROPOSED WOVEN WIRE FENCE
	NRPW EPHEMERAL STREAM
	RPW PERENNIAL STREAM
	PEM WETLANDS
	RPW INTERMITTENT
	POW WETLANDS
	DITCH
(24)	SF, SSF AND SILT SOCK INDICATOR

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
52			303
53			57
54			24
55			26
56			25
57		34	
58		62	
59		138	
60		168	
SUBTOTAL 3		402	433
SUBTOTAL 2		1,793	850
SUBTOTAL 1		1,035	46
TOTALS		3,230	1,328



NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE
ERIC S GESSLER
DEED BOOK 245 PAGE 242
TAX MAP 2 PARCEL 11
TRUCK TURN OUT
ENTIRE FLAT SURFACE AREA TO HAVE FILTER FABRIC AND STONE APPLIED PER THE ROADWAY TYPICAL DETAIL. QUANTITIES FOR FABRIC AND STONE ARE INCLUDED IN THE ACCESS ROAD QUANTITIES.
INSTALL ROCK CHECK DAMS (TYP.); SEE DETAIL
NAD83 N39° 21' 47.4763"
NAD83 W80° 43' 19.2884"
INSTALL 280 LF DIVERSION DITCH
NAD83 N39° 21' 48.2485"
NAD83 W80° 43' 18.5785"
CHESTNUT DRILL PAD
ELEVATION 1115.0'
CENTER OF PAD LOCATION
NAD83 LAT. 39°21'47.8537"
NAD83 LONG. 80°43'16.2343"
NAD83 N39° 21' 49.1668"
NAD83 W80° 43' 14.5332"
INSTALL 190 LF DIVERSION DITCH
NAD83 N39° 21' 48.4348"
NAD83 W80° 43' 13.8789"
NAD83 N39° 21' 47.4580"
NAD83 W80° 43' 13.8901"
INSTALL 4 SUMPS PER ANTERO DETAIL. PROVIDE RIP RAP OUTLET STONE WHERE SHOWN.
INSTALL 350 LF DIVERSION DITCH
NAD83 N39° 21' 46.5469"
NAD83 W80° 43' 17.9353"
NAD83 N39° 21' 47.3254"
NAD83 W80° 43' 18.5624"
SEE SHEET 8
MATCHLINE STA. 26+00
80.5
202.8
145.0
331.0
180.0
30.0
TRUSTEES CHESTNUT
GROVE CHURCH
DEED BOOK 183 PAGE 581
TAX MAP 5 PARCEL 30
APPROVED
WVDEP OOG
6/19/2013

GRAPHIC SCALE
0 25 50 100
1 inch = 50 feet

DATE SURVEYED	SHEET NO.	TOTAL SHEETS
6-13-2013	9	36

ENGINEERING AND SURVEYING
CHARLESTON, WV 25312
www.whitebrothers.com

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
EROSION & SEDIMENT CONTROL PLAN
CHESTNUT DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

NUMBER	REVISION	DATE	BY